Engaging the Federal Workforce in STEM Volunteer Service

Corporation for NATIONAL & COMMUNITY SERVICE

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Introduction

The President has emphasized the critical role that science, technology, engineering and math (STEM) professionals can play in inspiring more students in STEM subjects, calling on the more than 200,000 Federal scientists and engineers[1] to identify and pursue STEM-related volunteer activities in their communities. The President has highlighted numerous creative ways to engage young people in STEM fields – from science and maker festivals to robotics competitions and mentoring opportunities and more. Even before the President's call to action, the Federal workforce has supported STEM engagement activities[2] for decades through various Federal agency and department programs.

An interagency team comprising Excellence in Government (EIG) Fellows from the Department of Defense, Department of Energy, Department of State, the Environmental Protection Agency, and the Defense Nuclear Facilities Safety Board (hereafter, the EIG Team), has partnered with the Corporation for National and Community Service (CNCS) and the White House Office of Science and Technology Policy (OSTP) on an initiative to increase Federal volunteerism in STEM engagement activities. This collaboration seeks to build on the STEM-related work that is already being accomplished in the Federal government to reach the President's vision. The purpose of this paper is to identify key elements used to build STEM volunteer programs within Federal agencies that can be applied to any Federal agency.

Background/Methodology

The EIG Team conducted research and interviews to benchmark Federal agency STEM engagement programs. The goal of this activity was to understand the key elements of programs that most effectively promote and facilitate Federal workforce participation in STEM-related volunteer activities. This was not intended to be a comprehensive, government-wide benchmarking effort; however, the EIG Team did seek to benchmark the STEM engagement programs from the larger Federal agencies with STEM-based missions. More detailed descriptions of the key elements from each agency's program can be found in the attached collection of STEM Engagement Highlights documents. As this effort progressed, a pattern of shared successful practices emerged and the following is a distillation of these practices.
Key Demonstrated Practices

The following are key practices identified across effective, sustainable Federal STEM volunteer programs:

- Senior Leader Support: Unequivocal and visible senior leader support for the workforce's participation in STEM engagement activities makes it clear that STEM volunteerism is an agency priority and makes it easier for STEM volunteer advocates to garner the support they need to grow the base of volunteers within the agency. The more senior the leader, the more impactful the show of support. Senior leader support was a universal quality of all the agencies benchmarked for this effort. Some examples include a former Secretary issuing a department-wide memorandum to establish a new STEM volunteer program or a Secretary delivering keynote remarks at a department's signature STEM volunteering event.

- Linkage to Organization's Strategic Plan or Mission: STEM volunteer programs clearly linked to the performance goals and performance indicators in the agency's strategic plan were better able to garner the resources they needed. For some organizations, this linkage is clear and direct. For example, one agency includes a fiscal year

[1] From: John Berry, Director Memorandum for Chief of Human Capital Officers, "Participation in STEM Activities and Initiatives." August 14, 2012.
[2] For the purposes of this paper, the terms "STEM engagement" and "STEM engagement activities" are inclusive of both STEM education and STEM outreach. The definition of STEM education and STEM outreach vary by Federal organization, but generally the former refers to an activity that primarily focuses on efforts to enhance STEM learning while the latter focuses on promoting Federal organizations while simultaneously fostering an appreciation for STEM content. Both types of activities are valuable means of stimulating youth interest in STEM subjects and awareness of STEM careers in public service.

performance indicator to engage with a certain number of elementary and secondary students through STEM engagement activities. For other agencies, the linkage is less direct and is often made through recruiting or diversity programs. For agencies struggling to find the dedicated resources needed to build a robust volunteer base, it may be helpful to consider including specific STEM volunteer-related goals and performance indicators in the next update of the agency's strategic plan.

- Committed/Dedicated Advocate(s): Whether it's a dedicated staff position or a volunteer with passion for STEM engagement, the agency needs a committed advocate to manage the organization's STEM volunteer program. This individual helps to maintain a focus on program-specific goals and program participation within the agency. Organizations with employees who have part time or full time job responsibilities dedicated to organizing STEM engagement activities appear to have more robust programs than organizations lacking dedicated staff. For example, one Federal agency has dedicated STEM program managers in each regional office who oversee participant recruitment and matching, training, information dissemination, volunteer tracking, and reporting.

- Empowered Supervisors/Employees: Employees with the willingness to volunteer are at the heart of any effective volunteer program. Organizations that can provide willing employees and their supervisors with direction, agency or department-wide guidance (including rules for taking time off for STEM volunteering), and awareness of high-impact STEM engagement opportunities are well positioned to sustain an effective STEM volunteer program. In many ways, momentum has already started to empower supervisors and employees at the highest levels with the President's comments, OPM's guidance on STEM outreach, and OPM's guidance on leave and absence for volunteering efforts[3]. For example, many Federal departments have a policy letter in place that supports employee participation in STEM volunteer activities at some of its locations, while others have policy and guidance for the entire department. In addition, some agencies have taken steps to make the process for enrolling in STEM engagement activities as simple as possible, empowering employees to participate. As an example, one Federal agency actively works to make it easy for employees to volunteer through simple self-selection/tracking process, training, active communications, and recognition.

Although not as widely observed, the following demonstrated practices appear to be important to building an effective, sustainable STEM volunteer program:

- Support Structure: The more established STEM engagement programs across the Federal government have a structured support system in place ensuring resources and attention are directed towards achieving the organization's STEM engagement goals and objectives. The support structures reviewed tended to focus on guiding organizational support, coordinating STEM-related efforts, and vetting the effectiveness of STEM engagement activities. The overall structure allowed each organization to centrally manage efforts across the entire organization but implement locally where engagement actually happens. For example, an agency's centrally-located Office of Education works with geographically-dispersed Centers to achieve a broad-reaching, yet fully coordinated STEM engagement framework.

- Training: Most of the more established STEM volunteer programs have taken specific steps to make the experience more effective by using training programs and toolkits. One agency has a complete program that provides educational tools, comprehensive training, turnkey kits and curriculum for education demonstrations, hands-on activities, and speaking engagements undertaken by employees. These tools not only enhance the quality of STEM outreach activities, but decrease the time commitment required for employees to prepare for the engagements with youth. Another department utilizes an intranet site to provide employees with lesson plans, websites, and ideas for hands-on STEM education activities specifically focused on their mission.

- Effective Communications: Building awareness about STEM volunteer programs and their success throughout

[3] Fact Sheet: Guidance on Scheduling Work and Granting Time Off to Permit Federal Employees to Participate in Volunteer Activities
https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/related-information/

the organization gains senior leader engagement, commitment, and support; fosters a sense of pride among employees; energizes employees to volunteer, and builds good will in local communities. For example, as a starting point, information regarding one agency's volunteer programs, including its leave policy to support volunteering, is disseminated through new employee orientation sessions, an intranet website, affinity groups, and information sessions hosted by partner organizations.

- Recognition Program: Although not universally implemented, most agencies acknowledged that a STEM volunteer recognition program is useful and motivating (several organizations are currently developing recognition programs). Ideally, the organization would provide high-profile awards endorsed by top leadership. Senior leadership at one Federal agency distributes the annual awards recognizing employee participation in STEM-related volunteering activities. This type of recognition also serves as one of the best forms of marketing and communications mentioned above. At a minimum, the volunteer should receive some sort of recognition to acknowledge their volunteer efforts on behalf of the agency.

The following demonstrated practices are more programmatic in nature, but useful in developing an effective STEM volunteer program.

- Goals/Metrics/Effectiveness: This is one of the more difficult practices to implement, especially with K-12 volunteer programs. Setting goals and capturing basic metrics (e.g., number of student participants, volunteers, and hours) should be done, but measuring the long-term impact of K-12 STEM engagement activities on a student's chosen field and career path is extremely difficult. The organizations that have made strides toward measuring impacts have used K-12 logic-based pipeline and engagement models to identify programs with the best return on investment. Those organizations evaluate their STEM volunteer programs on an annual basis to determine each program's effectiveness. For example, one Federal agency's educational outreach program has clearly defined goals, objectives, and priorities that strive to shape a STEM literate citizenry, resource STEM savvy educators, and provide a sustainable infrastructure. Additionally, it has a comprehensive and robust evaluation process that focuses on annual observations to identify, share, scale-up, and further test promising practices.

- Participant Tracking: Tracking participation is one measure that receives special attention from the agencies benchmarked. This metric communicates organizational commitment to senior leaders and others inside and outside the organization. Some agencies that allow for employee participation in STEM engagement activities during normal work hours have a specific participant tracking code. Others use simple online forms to track participant time.

- Partnerships: Some organizations have formed partnerships with STEM point of service organizations, such as schools and non-profit organizations (often times on a local basis) to focus their efforts and provide support on training, orientation, and other logistics. Many of these organizations have already proven, viable and effective programs. For example, some Federal departments partner with academia, industry, not-for-profit organizations and other government agencies to effectively engage, inspire, and attract the next generation of STEM talent through K-college programs.

- Sustained Funding: Federal funding for STEM outreach is typically reserved for STEM education agencies or organizations with high STEM employment. A large portion of the funding is in the form of grants, which are used for STEM education investments. However, some of the organizations presented in the attached Highlights documents have been able to leverage the infrastructure built to oversee STEM education grants to support a STEM volunteer program. Two departments highlighted both receive annual funding for their STEM educational outreach programs, which they leverage to engage volunteers from their respective services.

Looking to the Future

The information presented in this document is designed to identify the key elements needed for any Federal agency to initiate or enhance a STEM engagement program (of which STEM volunteering is a key component). The practices

highlighted are meant to help an agency create a roadmap toward a more effective use of its workforce to support STEM engagement activities. This information may also be used to identify possible experiences or resources that can be leveraged across Federal government programs (e.g., training resources, engagement models). At its core, this project has been focused on building a culture of STEM volunteerism across the Federal government. The EIG team believes that this effort, in combination with an engaged interagency working group under the leadership of CNCS and OSTP will support enhanced coordination and synergy of STEM engagement activities across the Federal government to further advance the President's vision. The following pages profile some of the STEM engagement work already being performed by the Federal government.

The United States Air Force

Summary

Today, 25 United States Air Force (USAF) bases and lab sites are engaged in Science, Technology, Engineering and Math (STEM) education and community outreach with K-12 students and teachers. In 2014, the USAF impacted over 1,400 Schools, 4,500 Teachers, and 200,000 students through the USAF STEM outreach program. The mission statement of the USAF program is "Increase the STEM talent pool by exposing as many students and influencers as possible, including those underrepresented in STEM, to Air Force STEM expertise, technical facilities/equipment and STEM concepts through varied STEM outreach activities."

Key components of the USAF STEM Outreach program:

- Clear support from the AF Secretary and Chief of Staff
- Published "Bright Horizons" STEM workforce
- Strategic Roadmap: includes STEM Outreach Program governed by USAF STEM Advisory Council
- Permission for employees and supervisors to volunteer for STEM Outreach Program activities is currently addressed in a policy guidance letter
- The program is a component of Bright Horizons, works through a National STEM Outreach Director who coordinates activities through local STEM leads at bases and lab sites
- Participation is tracked locally and reported annually to the USAF STEM Outreach Office and leadership
- Self-selecting participation by employees with supervisor approval
- Outreach is typically completed during normal working hours as part of employee's duties
- Outreach engagements are vetted by the Director to ensure contributions are meaningful, impactful, and align with USAF mission
- Recognition program for STEM volunteers is currently in development
- Successes are regularly briefed to USAF leadership and highlighted via the USAF STEM Facebook page.

Background

The Air Force recognizes there is a critical need for STEM talent for future technology and innovation efforts within our nation's STEM workforce. A diversified STEM talent pool will establish the pace of technology advancements and enable the Air Force to avoid technological surprises. A transformational STEM workforce will also direct the path of technological dominance and sustain a combat edge for U.S. armed services.

The USAF STEM Outreach Office at Wright-Patterson AF Base, Ohio serves the Air Force and surrounding communities through fostering development, improvement, coordination, and assessment of Air Force STEM outreach programs across the United States. The office also works with other DoD components, academia, and industry to efficiently and effectively improve K-12 STEM literacy.

As a result of these opportunities, the future STEM workforce will be well equipped to lead us through new technological advancements and innovations for generations to come.

Challenges Identified

- Difficult to measure the return on investment of K-12 STEM outreach activities to the USAF. Need to develop both impact metrics and anecdotes to tell K-12 STEM 'story.'
- Leaders are hesitant to commit resources without a clear "permission" through authoritative guidance. The USAF is currently developing specific guidance to address STEM Outreach.

Spotlight: USAF Academy Center for K-12 STEM Outreach and Research

The United States Air Force Academy, with its decades of building our nation's STEM professionals and Air Force leaders, stands ready to expand its role in national and regional STEM education needs. The USAF Academy Center for K-12 STEM Outreach and Research is looking for and investing in regional STEM outreach solutions that will offer valuable lessons and a path forward for other communities across the country. www.usafa.edu/df/dfe/dfer/centers/stem/

For More Information

You can find more information about USAF's STEM Outreach program by visiting: www.facebook.com/AirForceSTEM, www.afstem.org, or contacting Rick Baker, Director of USAF STEM Outreach Programs at 937-656-4868.

The Department of Education

Summary

The Department of Education's (ED) volunteer programs have been active for over ten years and its leave policy to support volunteering, called the Education Volunteers Initiative (EVI), even longer. The EVI provides ED employees with the opportunity to use administrative leave to enable them to volunteer in the community during the workday. ED's Office of Human Resources (HR) manages the EVI leave policy through its Work/Life Branch. ED's Office of Communications and Outreach (OCO) oversees Volunteer in Education Programs that pair ED employees with local students, including through Horton's Kids (see Spotlight), Everybody Wins! DC (EW!DC), and Higher Achievement. Under the EVI, ED employees may also choose other volunteer activities that interest them. While ED's volunteerism is not STEM-specific, its EVI leave policy is an excellent example of how a department can use Office of Personnel Management federal leave flexibilities.

Key components of ED's Volunteer Programs include:

- Clear HR policy matching one hour of administrative leave for each hour of leave taken by the employee (up to four hours per pay period) for specified types of volunteer work in the community
- Supervisory approval is required for all leave requests. ED employees can volunteer as often as they like as long as supervisors are willing to approve the absence, but ED will only match up to four hours per pay period
- Flexibility in specified types of volunteer work to include tutoring, mentoring, library assistance, vocational training, STEM volunteering, after-school youth programs, and more. ED employees choose a volunteer activity that is meaningful, and may include an activity in which their own child is a participant
- Leadership buy-in supporting volunteer activities at schools or education-related organizations
- Alignment with ED's mission of providing educational opportunity and improving student achievement
- Information about volunteering is disseminated through new employee orientation sessions, an intranet website, Work-Life Programs, and information sessions hosted by the various partners
- ED uses a standard form that employees should submit following the volunteer activity which includes type of activity, organization information, the number and type of persons served, and a certification to be returned to the supervisor signed by the organization.

Background

The EVI leave policy and volunteer programs stem from ED's mission combined with a need for adult mentors and academic enrichment for students attending local schools. These programs started small and have grown through word-of-mouth, ED's internal website, and new employee outreach. The Secretary of Education encourages ED employees – through Department policies, official blogs, and direct involvement – to get engaged in their communities by volunteering to work with children. The Office of Human Resources said that the initiative helps retain and attract high-performing employees and allows ED to give back to the community.

Challenges Identified

- Tracking use of the EVI leave policy is limited by the employees' completion and submission of the volunteer form to the Work/Life Branch of HR Services. An electronic form could streamline this process; HR is considering an administrative leave EVI code to facilitate collecting and tracking data.
- OCO manages Volunteer in Education Programs with no officially dedicated staff or resources.

Spotlight: Horton's Kids

ED partners with Horton's Kids, a nonprofit that serves more than 200 children living in Anacostia (an economically challenged, Washington D.C. neighborhood with a high number of at-risk youth). The students are brought to the Department each week for intensive one-on-one tutoring. Tutors work with K-5 students in a variety of subject areas to help them achieve at grade level and to provide them positive role models as they help to instill a love of learning. The tutoring takes place in ED's cafeteria and employees are eligible for one hour of administrative leave with approval from a supervisor. For some, pairing up with another tutor makes the commitment more manageable; tutors may also work as substitutes instead of being assigned to one child. ED and Horton's Kids work together to hold orientations and train new tutors, as needed.

For More Information

You can find more information about ED's EVI leave program by contacting Kia Fuller at Kia.Fuller@ed.gov and ED's Volunteer in Education Programs by contacting Melinda Malico at Melinda.Malico@ed.gov. For more information about partner organizations, please access their websites.

The Department of Energy

Summary

The Department of Energy (DOE) offers many programs, internships, scholarships, and research opportunities focused on developing the next generation of STEM professionals, as well as fostering employee public service in STEM fields. Key elements of DOE's efforts include:

- The Minorities in Energy Initiative provides targeted Senior DOE leadership engagement through the STEM Mentoring Café (see Spotlight below).
- Interagency volunteer engagement through the STEM Volunteer Fairs, which aim to match the needs of the STEM and educational community in the Washington, D.C. area with Federal workers who are seeking STEM volunteer opportunities. The annual event is open to all Federal workers and contractors.
- STEM lesson plans and activities for K-12 teachers that leverage the DOE technical expertise, and distribution through partners including the 100kin10 network.
- Competitions and challenges in STEM fields such as the National Science Bowl that facilitate student and Federal staff (volunteer) interaction, which can lead to additional volunteer engagements.
- The STEM Mentor Program, an annual match of DOE headquartered employees to local undergraduate students in STEM for year-long mentoring pairs.
- Use of technology and role models to reach a wide audience. Inspiring youth by showcasing Women @ Energy, talented DOE and lab female employees who are helping change the world through transformative science and technology.
- The Minorities in Energy Initiative provides targeted activities and a sustainable ambassador model to connect diverse stakeholders and address challenges and opportunities for minority engagement in energy economic participation, STEM education, and climate change.
- Collaboration with the Department of Commerce on a lab-to-market initiative that will help catalyze regional innovation ecosystems and stimulate job creation and business growth opportunities for minority business enterprises and minority serving institutions.

- Supporting Million Women Mentors and the STEM Collaborative programs to engage federal employees as mentors.
- Promotion of the Administration's 1 million hour commitment via Energy social media and a webinar series that engages employees in STEM volunteer training (first training held August 13, 2015).
- A Cybersecurity Workforce Pipeline program providing $25 Million in grants in support of 13 HBCUs, a South Carolina school district, and two DOE labs to institute a partnership with the next generation of future leaders and increase the number of minority students pursuing cyber security careers, and support the National Nuclear Security Administration in meeting its cyber security demands.

Background

The Secretary of Energy has called on DOE's leadership to promote a workplace culture that is capable of empowering and retaining the talented workforce of over 13,000 Federal employees through maximizing the use of the many workplace flexibilities. The more than 2,600 current DOE Federal scientists and engineers have a unique opportunity to demonstrate progress toward the DOE Secretary's focus on employee engagement to meet DOE's mission of ensuring America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. Through DOE's strategic plan, technical offices and senior leadership, a variety of STEM activities are occurring and an increasing number of DOE staff are volunteering in STEM fields.

Spotlight: STEM Mentoring Café

The STEM Mentoring Café is a DOE and Department of Education effort to engage middle school students and their teachers with federal STEM professionals, through speed mentoring sessions and a commitment to ongoing mentoring from federal employees. By engaging federal scientists, particularly women, with girls and minorities who are underrepresented in STEM, DOE aims to spark increased confidence in those students to pursue STEM. Students and teachers spend two hours in show-and-tell chats at a hosting science museum, with mentors rotating table to table. Teachers are given take-home material, prepared by the DOE's Education and Workforce Development team, to continue STEM learning in the classroom, and federal employees commit to serving an additional 20 hours annually as a mentor to students in their community. The STEM Mentoring Café is run by DOE in partnership with the Association of Science-Technology Centers, a global organization supporting science centers and learning, and the National Girls Collaborative Project.

For More Information

You can find more information about DOE's STEM activities by visiting: energy.gov/STEM or sending an email to STEMED@hq.doe.gov.

Department of the Navy, Office of Naval Research

Summary

The Department of the Navy (DoN) recognizes that a healthy STEM workforce is critical to meeting the Navy and Marine Corps' greatest challenges. As such, the DoN is actively engaging in efforts to improve STEM education in the United States over the next decade through Naval STEM Education and Workforce Initiatives.

The Naval STEM Coordination Office, located at the Office of Naval Research (ONR), under the leadership of the Chief of Naval Research as the Naval STEM Executive, serves as the central coordination and information resource for Naval STEM efforts. ONR coordinates, executes, and promotes the science and technology programs of the United States Navy and Marine Corps. These efforts, located at naval commands and facilities, aim to:

- Inspire the next generation of scientists and engineers
- Engage students and build their STEM confidence and skills through hands-on learning activities that

incorporate naval-relevant content
- Educate students to be well prepared for employment in STEM careers that support the Navy and Marine Corps
- Employ, retain and develop naval STEM professionals
- Collaborate on STEM efforts across the DoN, federal government and best practice organizations.

The key to ensuring that the Navy and Marine Corps maintains a world class STEM workforce lies in supporting STEM formal and informal education across a continuum of experiences from kindergarten through higher education. This will require new and innovative ideas that enable the Navy and Marine Corps to inspire, engage, educate and ultimately employ an effective STEM workforce. The DoN has established a portfolio of programs to excite, engage, and educate a wide range of students in STEM. Currently these efforts:

- Reach students in all 50 states
- Are concentrated largely around naval activities, commands, and laboratories
- Include over 30 naval organizations
- Engage more than 80,000 students
- Involve over 5,000 teachers
- Include over 2,000 naval volunteers

Background

The Office of Naval Research (ONR) is committed identifying and attracting young scientists in the fields of science, technology, engineering and mathematics (STEM). As part of this effort, the ONR provides programs for K-12 students designed to build excitement about science and careers in science and engineering. ONR participates and sponsors science fairs, college internships, graduate fellowships and curricular enrichment programs. Outreach initiatives encourage, promote and coordinate naval science and technology both domestically and abroad.

Spotlight

The Science and Engineering Apprentice Program (SEAP) places academically talented high school students with interest and ability in science and mathematics as apprentices in Department of Defense laboratories for eight weeks during the summer. These students work with scientists and engineers who act as mentors. The program offers students a unique and positive experience in their fields of interest, thus encouraging them to pursue careers in science and engineering. There are over 35 Navy and Army laboratories currently participating in the program.

For more Information

You can find more information about ONR STEM Education and Outreach by visiting:
http://www.onr.navy.mil/Education-Outreach.aspx